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The VK2ZOI "Flowerpot Antenna" - A physically end fed Half Wave "Coaxial Dipole" for 2 metres and 70 centimetres

For 2m and 70cm FM I use a mounted on a lightweight aluminium telescopic pole on the apex of the hose. The base of the antenna (the bottom of its radiating element) is approximately 11 metres above ground level. This antenna is based on the Controlled Feeder Radiation principle (CFR) and is described by VK2ZOI on his website. Also known as a "Coaxial Dipole". My version is described below.

Also seen in the photograph are the ropes that support the H.F. wire aerials.

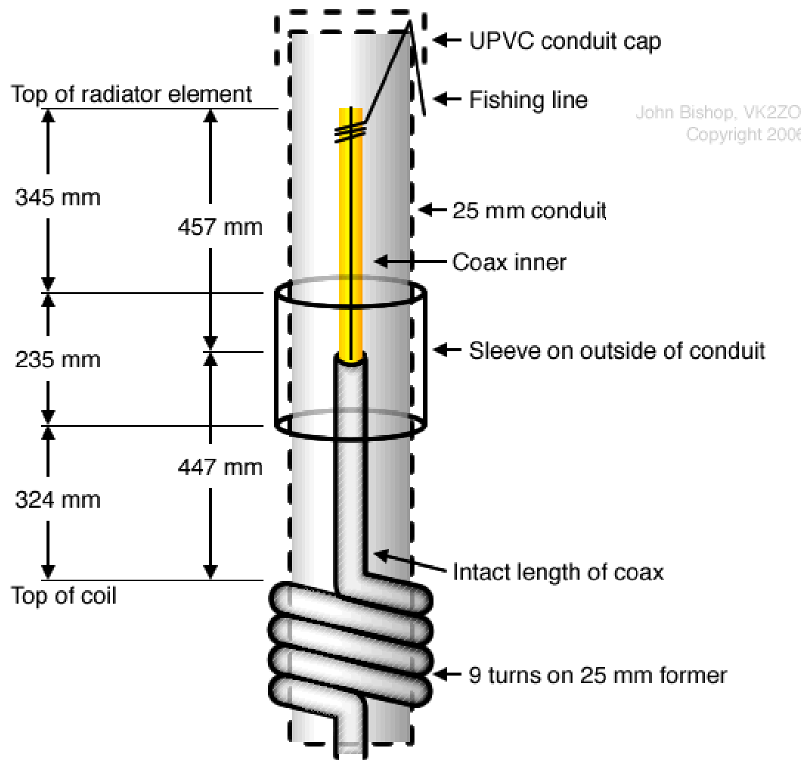
Home brew dual band vertical antenna for 2 metres and 70 cms
(Coaxial Dipole / Controlled Feeder Radiation Antenna / 'Flowerpot Antenna')

VK2ZOI has produced some extremely interesting and potentially very useful dipole antenna designs. The designs could form the basis for a great home-brew antenna project since it is physically end fed and can also be made into a dual band aerial for 2 metres and 70 centimetres, so forming the basis of a viable alternative to buying an expensive commercially manufactured 'white stick' antenna.

The final dual band version works very well and can form the basis of a viable alternative to commercially made 'white stick' antennas, because there's nothing better than using your own home-brew antenna!

Physically, the feeder cable enters the antenna at the bottom end, so it looks like an end fed aerial. VK3TWO / VK6TWO describes it as a "Coaxial Dipole". 'Electrically' it is a simple dipole. The RF is travelling 'inside' the bottom 'element' and doesn't 'feed' the antenna until where the coax is cut - in the centre of the antenna, as shown in the diagram below. Where the outer braid is cut (electrically the centre feed point), the RF then radiates like a simple dipole, via the top radiator (coax core), and via the outside of the coax - the bottom half of the dipole. The top radiator is thinner than the lower radiator (hence why the lower radiator is slightly shorter than the upper radiator).

The coiling of the coax is simply forming an RF choke (high impedance point), to stop the RF continuing down the outside of the braid, thus electrically it 'appears' to be the end of the radiating element.



http://vk2zoi.com/articles/half-wave-flower-pot/

I purchased a 3 metre length of 25mm diameter conduit from B&Q, our local DIY centre and ordered some 25mm end caps and heatshrink from ebay. I already had some good quality RG58 for the feeder and main 2 metre radiating element and some aluminium foil for the 70cm sleeve dipole.

First of all I cut the RG58 cable to form the 2m radiating section and choke coil. Because the UK's 2m allocation of 144 to 146 MHz is narrower than the 144 to 148 MHz available in Australia, I varied slightly from the design shown. The centre of the UK's 2m band is about 1% longer in wavelength, so I decided to make both the top and bottom measurements 1% longer.

I therefore stripped 460 mm of the outer sheath and braid from the cable to form the top 1/4 wave element of the dipole. I then measured down 450 mm and marked the point where the lower 1/4 wave element would finish and the choke coil would start.

Next I attached a thin nylon cord to the top of the top radiator, the coax inner.

I then cut the 3 meter length of 25 mm conduit down to about 2.3 metres and drilled a hole where the coil would start, wound 9 turns of RG58 cable from that hole and marked the position of the lower hole. I then removed the coaxial cable and drilled the second, lower, hole.

I then pushed the radiating section of RG58 into the top hole and fed it up towards the top of the tube, stopping when the marker tape reached the hole. I then wound the coil and pushed the remainder of the RG58 through to lower hole and fitted a PL259 plug on the end.

I pulled the top of the radiator wire tight using the nylon cord and pushed the end cap on. The antenna was then ready to be tested on the 2 metre band. I found that the resonant frequency was rather too high, just above 146 MHz, so I pushed an additional 10 mm of coaxial cable into the upper section of the tube - therefore making the lower 1/4 wave section of the dipole 460 mm long - the same as the top section. I tightened up the choke coil winding again and performed another test.

This time the resonant point was just over 145.000 MHz - near enough the centre if the UK's 2 metre band. That was perfect, so the 70 cm sleeve element was then added - this is a 235 mm long tube of kitchen foil positioned exactly at the centre (feed) point of the 2 meter dipole within the tube.

The SWR was tested and found to be acceptable across both the 2m and 70cm bands.

I then fitted the end cap, applied the heatshrink to the coil and to the aluminium foil sleeve. I noticed that when the antenna tube was moved around the cable inside rattled around making a noise that may be rather annoying to anyone near its final location.

To help hold prevent the cable from rattling I pushed up 4 or 5 small pieces of foam material up the tube from the bottom to rest at various positions along its length. With these pieces in place the cable was certainly silenced, however it may have had a deleterious effect on the SWR.

With the antenna now in its finished physical state I naturally checked the SWR again to compare against the performance in its semi-complete state. I was pleased to find that the SWR was still fine across the 2m band, in fact the SWR was a little lower. However the SWR at the edges of the 70cm band was considerably higher - 1.8 at 440 MHz and about 2.2 at 430 MHz.

I conjectured that the heatshrink covering the foil sleeve dipole may have caused the change in response so I removed it, but the SWR was little different and the bandwidth on 70cm was now disappointingly narrower than expected and hoped for.

Although I cannot say for certain, because they cannot now be easily removed, but it may be possible that the pieces of foam may be the culprits for the difference.

While the bandwidth could not be improved, I decided to move the centre point of resonance down a little by increasing the length of the sleeve element from 235 mm to 245 mm. With that adjustment the SWR was now approximately 1.6 at 430 MHz but rising to 2.0 at 440 MHz. (Unfortunately I forgot to note the exact figures down in all cases).

When the antenna was connected to the 20 meter length of Westflex-103 back to the shack, the SWR reading were as follows:

2 Metres - SWR		70cms - SWR	
144.00	1.3	430.00	1.2
144.50	1.2	431.00	1.4
145.00	1.2	432.00	1.4
145.50	1.2	433.40	1.0
146.00	1.2	434.00	1.3
		435.00	1.8
		436.00	1.6
		437.00	1.0
		438.00	1.5
		439.00	2.0
		440.00	2.1

The SWR readings in the shack for 2 meters are lower than at the feed point, which is presumably due the losses in the feeder. The SWR readings for 70 cms look rather erratic, with a strange peak at 435 MHz, while the 430 MHz figure is lower than at the feed point of the antenna, and the 439 and 440 MHz figures are disappointingly higher than hoped for. The peculiar readings are likely due to feeder effects.

However the SWR at 433.4, in the FM simplex portion of the band, is very low.

The completed antenna was mounted to the aluminium mast by utilising brackets of the Watson W50 antenna. The brackets had to be reversed so that the narrower diameter of the 25mm tube could be held in place by the V Bolt, while the circular section that previously fitted over the base of the W50 now slid over the mast, which was coincidentally a similar diameter.

I made a small addition to the design in the form of a second small 150mm length of of the 25 mm conduit glued to a coupler section. This is slid into place at the bottom of the antenna to provide additional weather protection to the joint between the W-103 feeder and the RG58 of the antenna - which itself is covered in self amalgamating tape.

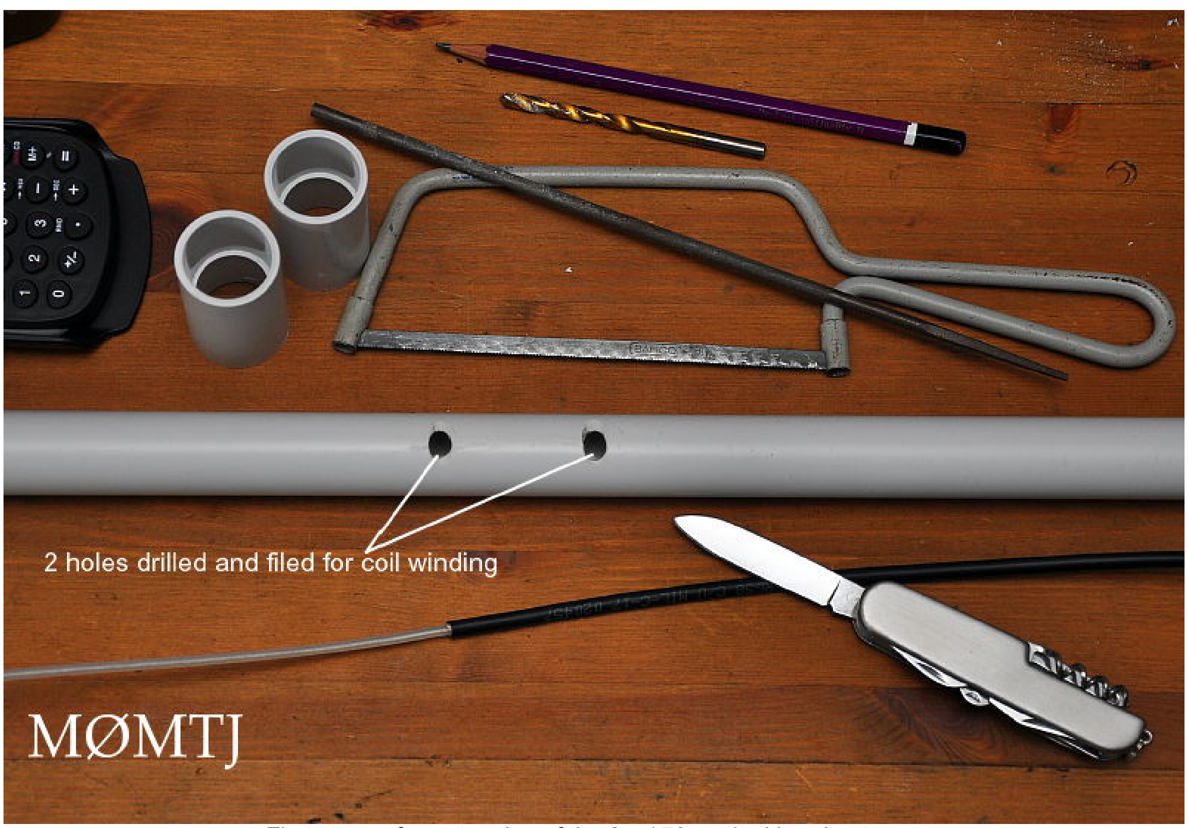
Shown in the table below are some signal comparisons with the Watson W-50 antenna; both were mounted on the same mast in the same position and at a height of approximately 7 metres above ground level. Becuase the S-Meter of the transceiver is not calibrated in absolute values, the figres are for relative comparison only - also bear in mind that a typical S Point represents 6dB - therefore the accuracy of these readings will be coarse and might be considered to be +/- 3dB - that's a rather wide variation.

Despite the relative crudeness of these comparisons, the results do seem to indiacte that the VK2ZOI antenna is marginally or slightly better than the W-50 on 2 metres and marginally worse on 70cms. I am quite pleased with this result and beleive that this antenna really could replace the need to buy an expensive commercially manufactured antenna.

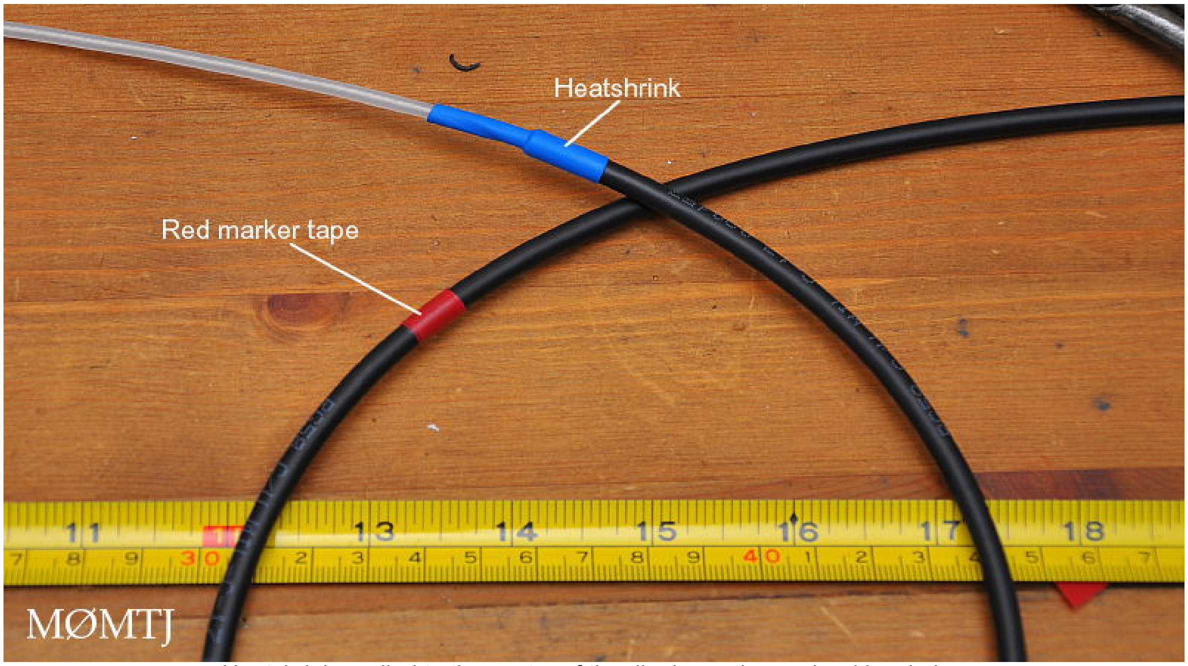
My only concern with this type of antenna is that there is no path to ground from the top element, as there would be with a folded dipole or a J-Pole type antenna. This may be a cause for concern as far as static build up is concerned.

Signal comparisons		
	Watson W-50	**"Flowerpot Antenna"**
2 Metres		
Station A	S7	S9
Station B	S5	S6
Station C	S4	S4
Station D	S9	S9
Station E	S6	S6
Station F	S0	S1
Station G	S2	S2
Station H	S2	S3
Station I	S6	S6
70 cms		
Station J	S0	S1
Station K	S5	S5
Station L	S5	S4
Station M	S0	S0
Station N	S9	S9
Station O	S6	S6
Station P	S7	S6

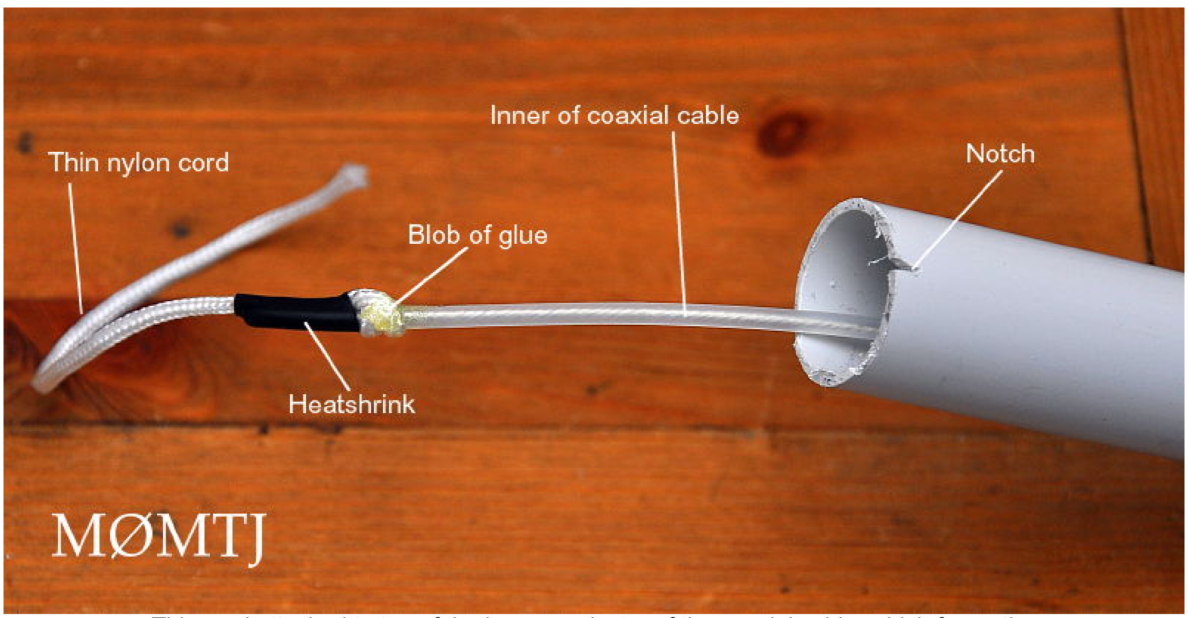
Please see the photographs below for a visual explanation of this project. Mike, MØMTJ. 05/03/2013



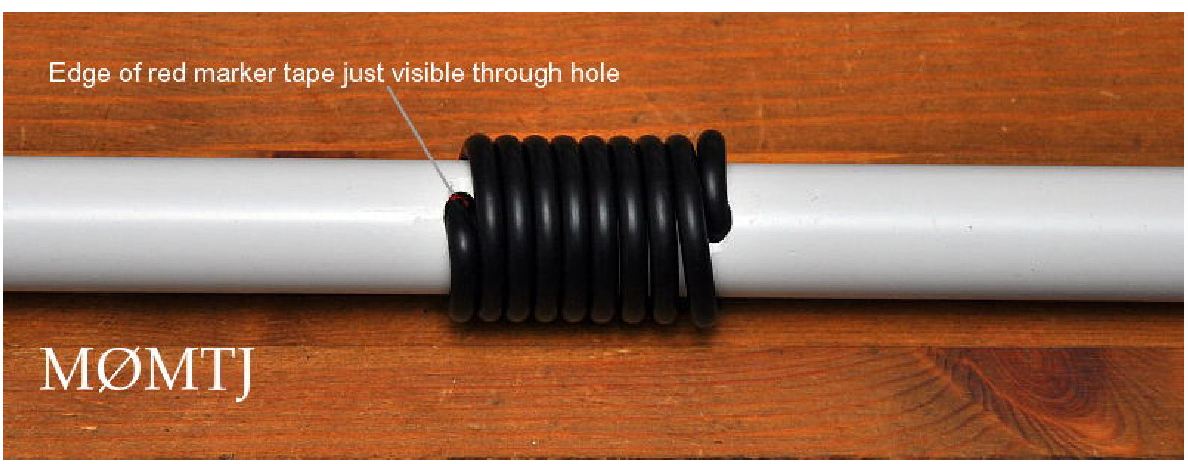
First stage of construction of the 2m / 70cm dual band antenna
Cutting the 25mm diameter conduit to the desired length and drilling
the two holes allowing the coil to be wound. MØMTJ



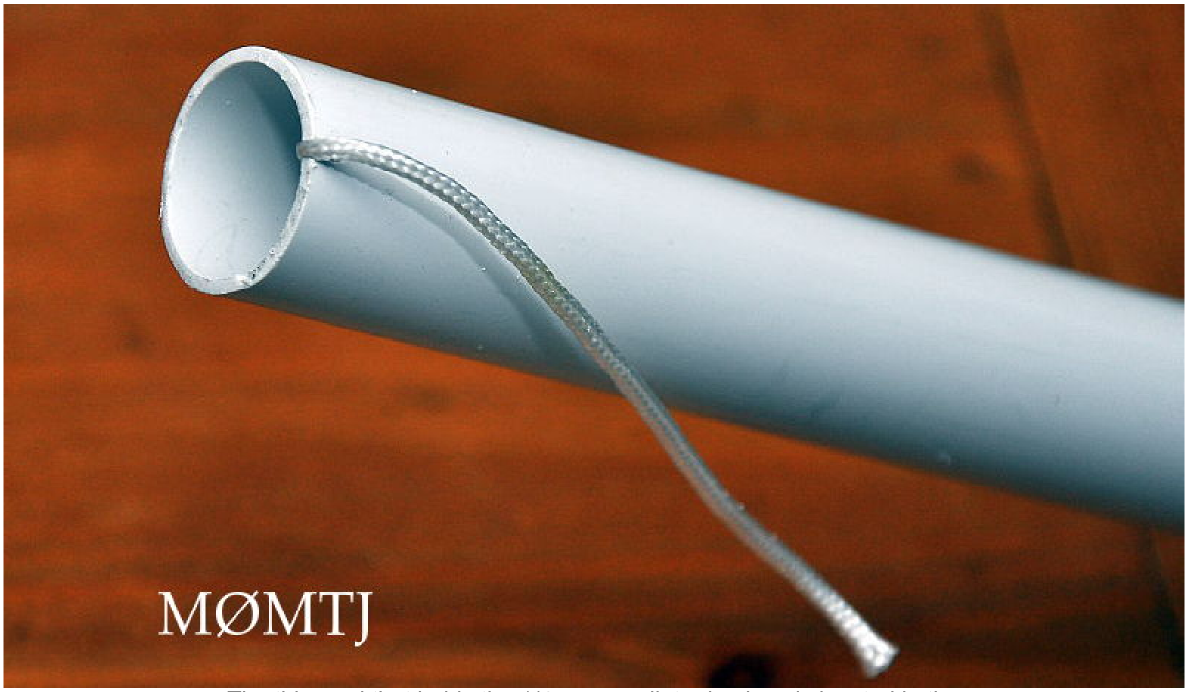
Heatshrink applied to the centre of the dipole section and red insulation tape added to mark the bottom of the dipole where the coil starts. MØMTJ



Thin cord attached to top of the inner conductor of the coaxial cable, which forms the top 1/4 wave section of the dipole with a piece of heatshrink and a blob of glue. MØMTJ



The line isolator choke is formed by winding 9 turns of the RG58 coaxial cable around the 25mm diameter conduit tubing. MØMTJ



The thin cord that holds the 1/4 wave radiator in place is located in the notch and will be trapped in place when the end cap is fitted. MØMTJ

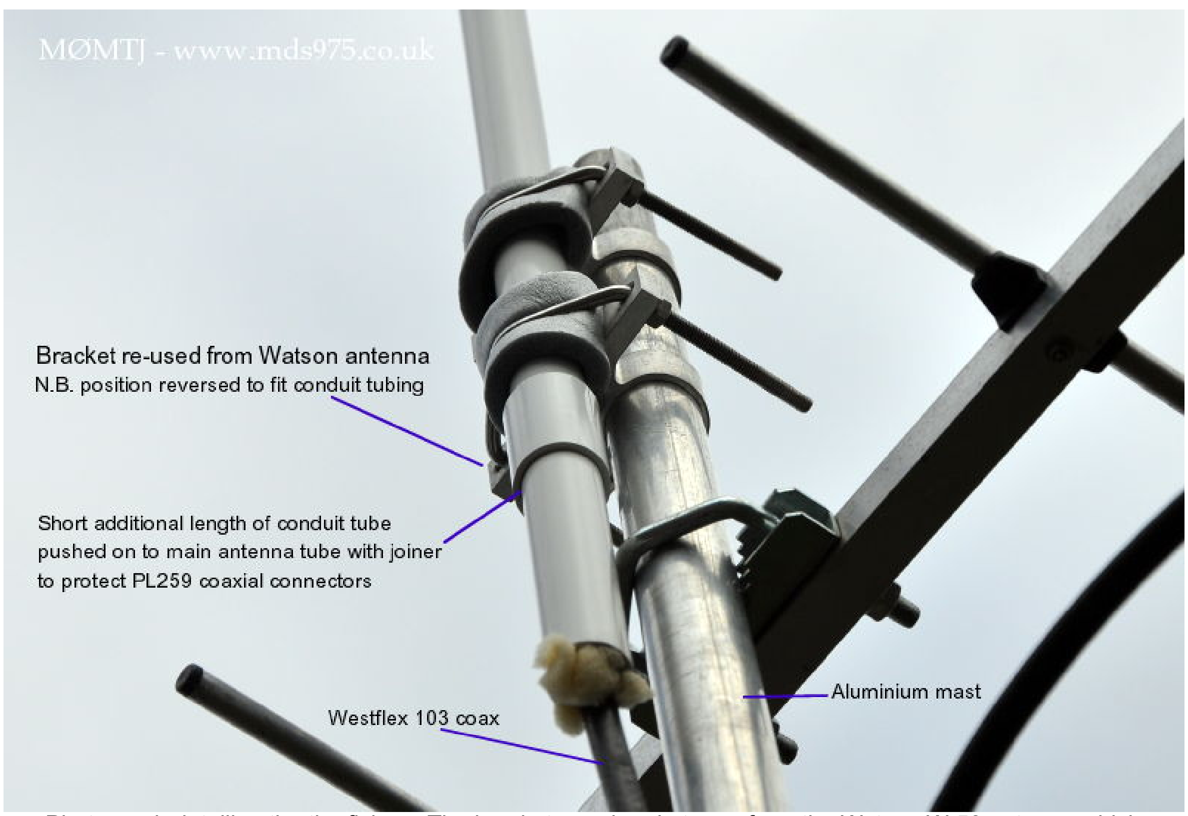
After testing, the coil was covered in heatshrink to prevent water entering the plastic tube.

The foil sleeve dipole for 70cms is covered in heatshrink.

Oops. Lesson learned. When applying heat to the heatshrink I held the tube above the ground and the plastic of the tube started to go soft and bend out of shape. The buckle in the tube can be seen in this photograph.
Lesson: When applying heat, keep the tube flat on the ground or work bench and roll the tube along as the heatshrink shrinks into place ensuring that the tube does not distort or bend.

25 mm end cap sealed in place by heatshrink.

The completed antenna in place, mounted at the top of my aluminium push-up mast. The fixings used are the brackets from the Watson W-50 antenna which have been reversed so that the smaller diameter PVC tube is held in place by the V Bolts.



Photograph detailing the the fixings. The brackets are brackets are from the Watson W-50 antenna which have been reversed so that the smaller diameter PVC tube is held in place by the V Bolts.

For further detailed information and reading, please visit the excellent website of John Bishop VK2ZOI here: http://vk2zoi.com/articles/half-wave-flower-pot/

6 Metre Half Wave Coaxial Dipole - An end fed CFR Dipole antenna supported by a 3 metre long fibreglass fishing pole for 50 MHz

In 2014 I decided to remove the 4 Metre J-Pole antenna from my push-up mast due to the fact that the band is relatively quiet and that I only have the 5 watt Wouxon handheld transceiver for 70 MHz.

I decided that having a good, full size antenna, for the 6 Metre band would be more useful and potentially more rewarding since it can be used with a 100watt HF radio that covers 50 MHz.

The choice of antenna was an easy one. With the great success of the "flowerpot antenna", I decided to build a version for 6 Metres.

Similar designs of Coaxial Dipole antennas had also been featured in recent editions of the RSGB publication RadCom during 2012 and 2013. The antennas in RadCom are described as Controlled Feeder Radiation (C.F.R.) Dipole antennas - the tuned choke at the feed-point controlling, or choking off, the common mode current that would otherwise flow down the outside of the coaxial feeder cable causing E.M.C. issues on transmit, high S.W.R. reduced efficiency and noise on receive. See references below

The advantage of this design is that it can be physically end fed, so there is no feeder cable to route away from the centre of the dipole. Electrically, however, the feed point is at the centre of this dipole aerial, as explained earlier.

Rather than fit the antenna inside a PVC pipe, as with the previous dual band 2m / 70cm antenna described above, I decided to use a lighter weight and less conspicuous 3 metre long fibreglass fishing pole as the support. The completed radiating element simply being taped to the fishing pole.

I cut a length of MIL spec RG58 cable, about 4.5 metres long, to form the bottom half of the radiating section and the choke coil, leaving enough to form a short length (about 30 cm) of cable below the choke coil on to which is soldered a PL259 plug.

The choke consists of 15 turns of the RG58 coaxial cable wound on a 50mm diameter plastic former cut from the empty tube of a cartridge gun that previously contained silicone sealant - allowing a 30cm tail on to which the PL259 plug is fixed on one side and and about 1.31 metre length on the other side that will form part of the radiating element.

The half wave radiator therefore consists of a quarter wave bottom section of the RG58 cable and a quarter wave top section consisting of a length of multi-strand (single conductor) P.V.C. covered antenna wire.

A quarter wavelength at the mid point of the 6 Metre band is: 300 ÷ 51 MHz = 5.88 metres ÷ 4 = 1.47 metres

Due to velocity factor the actual length of the quarter wave sections will be shorter. With the materials that I used, I found that a factor of about 87% was about right, the 1/4 wave length being 1.29 metres.

The top tip of the bottom 1/4 wave section of the coaxial cable is stripped of about 2 cm of outer sheath and braid leaving the length of braided section, measured from where it exits the coil, 129 cm long. The inner conductor is then stripped of 1cm of insulation. This is effectively the centre point of the dipole. To this point is soldered the 129 cm length of the P.V.C. covered aerial wire to form the top half of the antenna. In practice, use a slightly longer length of wire, and then fold over the excess to for the 129 cm length - this can then be used to adjust for lowest SWR at 51 MHz.

The length of the radiating section was therefore about 260 centimetres, plus about 13 centimeters for the coil former giving a total length of 273 cm. This allows about 27 cm of the bottom section of a 3 metre fishing pole to be used to fix to a supporting pole or mount - e.g. to the top of an aluminium mast.

Drill four small holes in the choke former so that when the fishing pole is placed through the centre of the former it can be fixed to the pole using two cable ties.

The radiating section (coax and PVC covered wire) is fixed to the top section of the fishing pole with good quality insulating tape.

The aerial can now be temporarily fixed to the mounting pole using suitable brackets - taking care not to crush the delicate fibreglass! Connect the PL259 plug to the antenna feeder cable using an SO239 back-to-back coupler and test the SWR with an antenna analyzer or SWR bridge. The lowest SWR should be centred on 51MHz and be low - less than 1.5. My reading was 1.2.

If the point of lowest SWR is significantly away from 51 MHz and/or the SWR at the band edges is too high (i.e. over 2) then length of the radiator will need to be adjusted. If the point is too low in frequency, the antenna is too long and will need to be shortened. If the point is too high in frequency, the antenna is too short and will need to be lengthened.

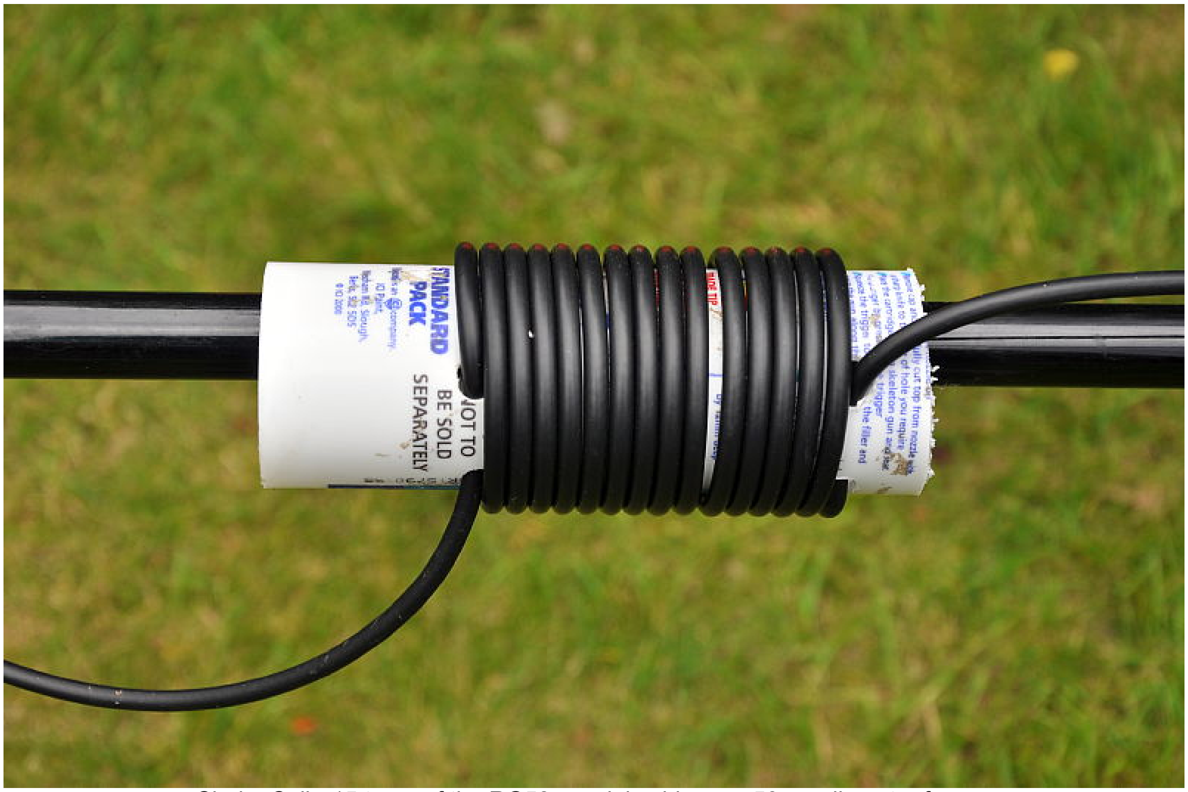
Adjustment can be achieved by pulling the coax through the coil to make it longer, or pushing the coaxial cable back

into the coil to make it shorter. Also ensure that the coil winding are adjusted to that they remain tight and neat. The top PVC covered wire section will also need to be lengthened or shortened accordingly by adjusting the folded over section.

Note that in practice, to obtain the very lowest SWR, the top PVC covered wire section may need to be slightly longer by perhaps 1 or 2 centimetres. This is probably due to the fact that the velocity factor of the PVC covered antenna wire is a little greater than the coaxial cable.

Once the antenna is adjusted correctly, ensure that the wires are securely taped to the fishing pole. Connect the permanent antenna feeder to the aerial using the SO239 coupler and weatherproof the joint thoroughly using self amalgamating tape. Use the very best quality coaxial cable possible to ensure lowest loss. I use Westflex 103, but consider MIL Spec RG8 or RG213 as the minimum standard.

50 MHz Coaxial Dipole / Controlled Feeder Radiation Antenna / 'Flowerpot Antenna'
A physically end fed fed half wave dipole antenna for 6 Metres



Choke Coil - 15 turns of the RG58 coaxial cable on a 50mm diameter former

VHF Band II Broadcast Band antenna for 88 to 108MHz -
Physically end fed, Coaxial Dipole / Controlled Feeder Radiation Antenna (CFR Dipole) for VHF broadcasts

I used a 2 metre long length of 25mm white plastic pipe, strengthened with with a 2 metre length of 21.5mm overflow pipe pushed up the inside.

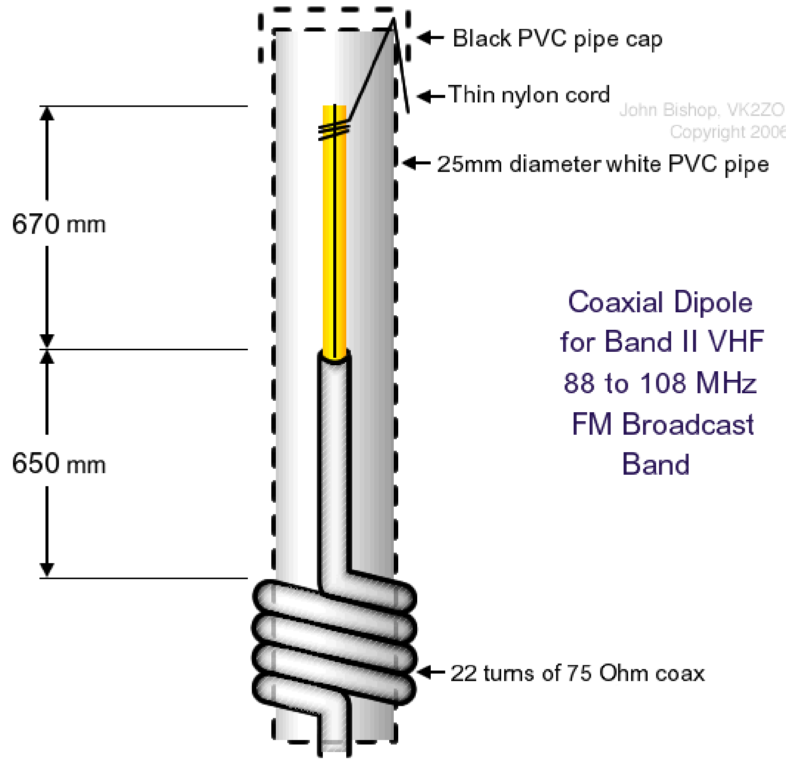
The radiating element is made from good quality 75 Ohm coaxial cable. Since VHF/FM broadcast tuners are designed to be fed with 75 Ohm coaxial cable, use high quality, low loss double shielded satellite grade coaxial cable for the feed between the aerial and the radio tuner. Use satellite F type connectors and joiners for lowest loss.

The top half of the radiating section is 670mm of the centre conductor (or a length of multi-strand PVC covered wire). The bottom half of the dipole is 650mm of the complete coaxial cable - choked off at the bottom by the coil section. The top part is held in place by a a short length of thin nylon cord, trapped in place by the top PVC cap. The cap itself is sealed on the outside by some self amalgamating tape.

The choke coil is 22 turns of the 75 Ohm coax wound around the 25mm pipe. Tightly spacing the windings of the coil will minimize the bandwidth covered but provide the lowest SWR at the centre point. A looser winding of the coil will widen the bandwidth covered, but lowest SWR achived will be a little higher.

Once the tuning of the radiating elements, coil winding and band coverage has been checked with an Antenna Analyzer, the coil section should be covered with heat shrink, taking great care not to overheat and deform the plastic pipe.

The actual final dimensions (as shown below) may well need some adjustment in length due to differences in cable and type of pipe used. However, with the dimensions shown, I achieved a minimum SWR of 1.3 at 97.4 MHz. The band edges at 88MHz and 108MHz were at an SWR of around 3.8 to 4.0 - which is probably OK for broadcast band reception. The frequency of lowest SWR can can be changed, if desired, by changing the lengths of the radiating sections - slightly longer for a lower frequency and slightly shorter for a higher frequency.



Coaxial Dipole for the 88 to 108 MHz Band II Broadcast Band
An effective, cheap and simple vertical antenna that is fed at its base

RSGB RadCom Articles:

The Controlled Feeder Radiation Dipole. Peter Dodd. RadCom, September 2012, page 22.

More On The CFR Dipole and Coax Chokes. Peter Dodd. RadCom, October 2012, page 54.

VHF CFR Dipoles and More on Common Modes Chokes. Peter Dodd. RadCom, January 2013, page 24.

The HAK Chokes Coaxial Dipole. Encouraging results from 2m to 20m. Peter Grant. RadCom, April 2013, page 22.

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VK3TWO / VK6TWO Comments:

Many years ago when I was working for a Service Centre, by accident we broke a commercial white stick antenna whilst using it for a task it wasn't intended for. I found that inside the fairly expensive commercial antenna the basis for the design was very similar to the coaxial dipole (as I call them).

Our local repeater club calls them "pogo sticks", which I can only assume is due to the coax coil resembling the spring of a pogo stick. This design had RG213 being fed inside an aluminium tube (the bottom radiator), and the outer braid was then terminated to this. The inner of the coax, then terminated to an identical aluminium tube which was of course the top radiator. Where this design largely differs, is that there was also a 1/4 wave stub of coax running parrallel with the bottom radiator (note that this was for single band operation, not dual band). The whole lot then slid inside the typical white tapered fibreglass housing. I didn't cut open the bottom mounting section to see how it was choking the RF, but I assume it had a handful of ferrites inside the metal base (an alternative way of making the RF choke).

The repeater group has built probably hundreds of these and sells them for $40 at local hamfests. We had a 'Jig' made so that all of the measurements were 'pre-marked' etc, and allowed us to mass manufacture them. Last year, we had planned the typical 'working bee' to make about 30 of them, but this time we had a very expensive Anritsu Sitemaster at our disposal. We discovered that the whilst the design we'd used for decades had a good SWR, it actually was far from optimal. With a heap of 'trial and error' (and with excellent visibility of what was really going on via the Anritsu - not just SWR) we were able to fine tune the design.

From memory, we actually needed more turns of the coax than we had been using (10.5 turns from memory), and our cutting measurements altered slightly. As to be expected, the number of turns was largely dependent on the size of the conduit being used, even changing from 25mm to 30mm etc.

We took several screenshots of the final SWR plots etc. These showed that the bandwidth of this antenna as VERY wide from an SWR point of view. I'll see if I can dig some of them up for you if you'd like.

73, Heath, VK3TWO / VK6TWO
MEngSc, GDipCompSc, DipEE
www.spooktech.net

http://www.warg.org.au - The West Australian Repeater Group Inc (WARG) is the largest amateur radio club in Western Australia (VK6).

D.I.Y. J-Pole Antennas - A really simple, quick and very cheap 'home brew' project J-Pole Antennas

J-Pole antennas for 2 meters, 4 metres, 6 metres and 10 metres :

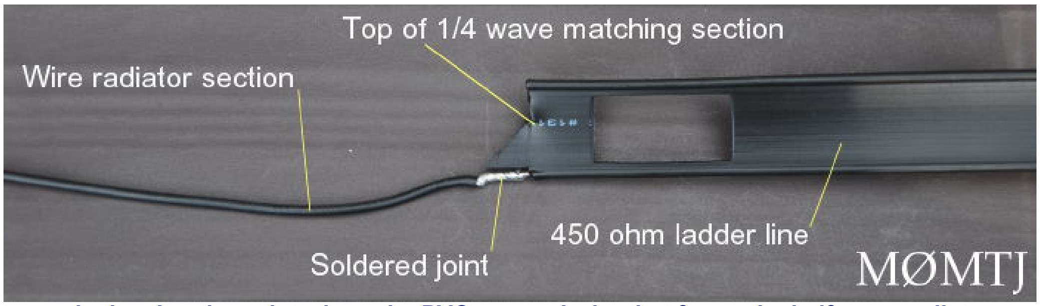
While experimenting with antennas in the garden in the summer of 2012 I thought that it would be good to have a hand-held radio in the shed to do some monitoring and make a few contacts. To improve upon the performance of the 'rubber duck' antenna I quickly made a J-Pole antenna for the 2 metre band.

It is made from a 47cm length of 450 ohm Wireman ladder line as the 1/4 wave matching section, plus a 97cm length of stranded wire as the 1/2 wave radiator. It is fed with 3 metres of Mil spec RG58 c/u coaxial cable that is soldered to the 1/4 wave matching section's impedance matching point at 3.5 cm from the bottom. The coax feeder is wound around some PVC tube to form a choke. The completed antenna is taped to a 2.2 metre long fibreglass fishing pole that I purchased from Poundland (for £1.00). It took about 20 minutes to make followed by some testing and adjustment with the antenna analyser. The fishing pole is lashed to the shed with some cable ties.

This simple antenna works pretty well, but being so low down signal strengths are not huge, but it's pleasing to get on the air with something so simple and cheap!

The Shed Antenna - a 2m J-Pole by M0MTJ
Note the simple choke balun at its base made by winding 8 turns
of the coaxial cable around a small off cut of white PVC water pipe.

The feed point of a J-Pole antenna made from Wireman 450 ohm ladder line.
For the 145 MHz antenna this feed point is 3.5 cm from the bottom of the ladder line section which is on the right hand side in this photograph. The coaxial cable used in this case was Mil spec RG58 c/u. But any good quality, low loss 50 ohm coaxial cable could be used. The wire radiator section is connected to the same conductor of the ladder line as the coaxial cable's centre conductor. For my antenna, fixed to a fibreglass fishing pole, the radiator wire was 97cm in length.



Photograph showing the point where the PVC covered wire that forms the half wave radiator section is soldered onto the top of the 450 ohm ladder line that forms the quarter wave matching section.

Inspired by DK7ZB. The J-Pole is a very effective antenna and being made of wire it is very light weight making it quite easy to fix in different positions. If you have problems installing a permanent antenna then making a wire antenna that can be easily supported on a lightweight push up telescopic fishing pole can make an ideal alternative.

The formulas to make a J-Pole antenna from 450 Ohm Wireman ladder line in this way are:

Length of 1/4 wave impedance matching section (450 ohm ladder line) Wavelength x 0.223
Length of 1/2 wave radiator (any reasonably strong PVC covered stranded wire) Wavelength x 0.471
The point at which the coax is connected to the 450 ohm ladder line will be about 5 to 10% of the length of the ladder line section up from the bottom.

The wavelength at mid point of the 2 metre band (145.00 MHz) is found by the quick calculation 300 ÷ 145 = 2.068 metres

So, to make a practical antenna:

The 1/4 wave section of 450 ladder line will be 2.07 x 0.223 = 0.47 metres long
The 1/2 wave wire radiator will be worked out as 2.07 x .471 = 0.975 metres long
The connecting point of the coax will be about 3.5 cm from the bottom of the 1/4 wave section. The optimal point may have to be found by some experimentation - as will the best length for the wire radiator.

The length of the wire radiator will be affected by surroundings. For example I fixed the wire to a fishing pole. The proximity of the fishing pole has the effect of electrically lengthening the wire; so using a 97.5cm length of wire fixed to a pole I found that it resonated (as expected) at a lower frequency, it therefore had to be shortened until the point of resonance (indicated by lowest SWR) was around 145.00 MHz. This should be done in the antenna's expected final position since the J-Pole is quite sensitive to its surroundings, so if these checks are done near the ground, once it is raised into its final position the SWR will have changed and the adjustments will have to be done again.

I found that 3.5 cm was good for the 2 metre band antenna, but for the 10 metre band version of the antenna a little more experimentation was required:

The VSWR reading may not be especially low, even though the point of resonance for the wire radiator may have been found. For the 10 metre band antenna at this this stage was about 1.7 indicating that the connection point of the coaxial cable to the 450 ladder line needs to be adjusted. The ladder line is used as an impedance transformer, transforming the very high impedance (hundreds of ohms) of the half wave wire radiator down to the 50 ohms required by the transceiver and the coaxial feeder cable. This connection point therefore affects the impedance of the antenna, the higher up the matching section it is the higher the impedance will be, and visa versa.

Once the length of the wire radiator has been set, the connection point can be moved up and down the ladder line until lowest SWR is achieved. A few centimetres of the PVC insulation has to be carefully scraped away from the copper conductor on each side of the ladder line using a craft knife. The inner conductor of the coaxial cable is quickly tack soldered on the side that is connected to the 1/2 wave wire radiator. The coaxial cable's braid is quickly tack soldered to the opposite side of the ladder line at this point, ensuring that both points are equal distance from the bottom. At this point temporary croc clips could be used, but I preferred a quick solder joint.

With radiator trimmed for resonance, the connection point of the coaxial cable can then be moved up or down the ladder line little by little; un-soldering and re-soldering the coax to the ladder line until a lowest possible SWR is achieved, indicating that the antenna is near the ideal 50 ohm impedance.

Once the ideal point is found the coaxial cable can be properly and permanently soldered to the ladder line.

6 Metre Band J Pole on the antenna analyser - it's getting close!

Each J-Pole took about 20 minutes to physically make out of the wire components. However the testing and adjusting took a bit more time. I used an antenna analyser which saved having to key the mike every time when using a basic VSWR bridge and causing unnecessary QRM, but even so, hoisting the fishing pole up and down numerous times took a little more time:

10 Meter J-Pole. For the 10 metre band J-Pole antenna this took perhaps another 20 or 30 minutes until I was satisfied with the adjustments. It may take a little longer if using an SWR meter.

6 Meter J-Pole. For the 6 metre band antenna the radiator wire had to be trimmed a little and the feed point adjusted to 6 cm, taking about 10 additional minutes to complete.

4 Metre J-Pole. For the 4 metre band, centred on 70.37 MHz

2 Meter J-Pole. For the 2 metre band antenna the wire radiator took a couple of attempts to get it to the correct length when attached to a fishing pole, but the feed point was spot on first time at 3.0 cm, again taking about 10 additional minutes to complete.

Here are some suggested dimensions for the 2 metre, 6 metre and 10 metre band versions, when supported by a fibreglass fishing pole:

Wire J-Pole Antennas	1/2 Wave Radiator	1/4 Wave Section	Feed Point
2 Metre Band Antenna	0.975 m	0.47 m	3.0 cm

4 Metre Band Antenna	**1.90 m**	**0.95 m**	**6.1 cm**
6 Metre Band Antenna	**2.815 m**	**1.33 m**	**6 cm**
10 Metre Band Antenna	**4.96 m**	**2.45 m**	**15 cm**

N.B. The 1/2 wave wire radiator section will be shorter than calculated when fixed to a fibreglass pole or other object.

To re-cap, the 1/2 wave section should be adjusted for resonance and the feed point position adjusted for minimum VSWR.

Sealing and waterproofing. Once the antenna is complete and has been checked and tested all the bare joints should be sealed against the weather with liquid electrical tape and self amalgamating tape. The coax should also be secured against the ladder line with a nylon cable tie as a strain relief to prevent the soldered feed point joints from breaking.

These J-Pole Antennas were inspired by DK7ZB - http://www.qsl.net/dk7zb/J_Pole/wiremanjpole.htm

Antennas 1 | Antennas 2 | Antennas 3 | Antennas 4 | Antennas 5 | Antennas 6 | Antennas 7

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